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[71] 申请人 星电器制造株式会社

地址 日本大阪府

共同申请人 三菱电机株式会社

[72] 发明人 竹内孝信 大林义昭 安田护

佐伯真一 大泽周治

[74] 专利代理机构 上海专利商标事务所

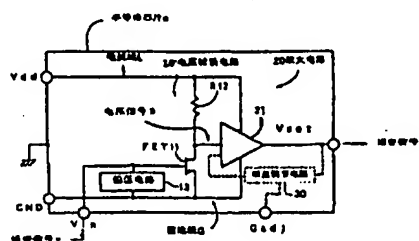
代理人 钱慰民

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[54] 发明名称 半导体放大电路和半导体驻极体电容扩音器

[57] 摘要

本发明提供了一种可以抵抗猝发噪声影响的半导体放大电路和半导体驻极体电容扩音器。包括:电压转换电路,用于接收弱信号并将该信号作为电压信号输出;和放大电路 20,用于接收电压信号,放大和发送该信号。电压转换电路和放大电路形成于同一个半导体芯片中。由于放大电路的输入端隐藏在半导体芯片中,所以猝发噪声几乎不能进入放大电路中。



# 说明书

## 半导体放大电路和半导体驻极体电容扩音器

本发明涉及一种抗猝发噪声影响的半导体放大电路，以及具有该电路的半导体驻极体电容扩音器。

驻极体电容扩音器广泛用作数字手提电话的扩音器等。

如图 10 所示，传统在驻极体电容扩音器基本上包括振动膜 2，它是一层高聚物驻极体薄膜，与圆环(ring)粘连在一起；背电极 3，它与振动膜 2 的相对；间隔器 4，它内插在背电极 3 和圆环 1 之间，用于在振动膜 2 和背电极 3 之间开拓一个空间；背电极支撑器 5，用于支撑背电极 3；IC 芯片 61、62，它们固定在印刷电路板 8 上；以及外壳 7，用于容纳上述器件。在该图中，标号 9 是前布。

电容器由振动膜 2 和背电极 3 组成，并且通过振动膜 2 振动改变电容器的电容，由此将声音转化成话音信号，然后放大和发送该信号。对于放大这一信号的电路，广泛使用如图 11 所示的半导体放大电路。

该电路由电压转换电路 A 和放大电路 B 组成构成，其中电压转换电路 A 用于将话音信号转换成电压信号并输出，而放大电路 B 用于放大由电压转换电路 A 输入的电压信号并输出。电压转换电路 A 形成于 IC 芯片 61 中，而放大电路 B 形成于 IC 芯片 62 中。在该图中，Vdd 表示电源电压端，GND 是接地电压端，Vout1 是电压转换电路 A 的输出端，而 Vout 是放大电路 B 的输出端。

但是，在此现有技术中，半导体放大电路易受猝发噪声的影响。也就是说，在数字手提电话（TDMA 系统）中建立的射频振荡器是猝发噪声的源（RF 猝发信号），并且由射频振荡器发出的猝发噪声会进入电源线或导线，并且较大的猝发成分（猝发工作频率：200—400Hz）将出现在半导体放大电路的输出信号中。特别是，放大电路 B 的输入信号线被暴露时，并且放大电路 B 放大了侵入该线路的猝发噪声，对于降低驻极体电容扩音器或手提电话本身中的噪声来说，这会引起严重的问题。

如果放大电路 20 的输出级设置噪声阻断电容，那么对低程度的猝发噪声是有效的，但不能充分抑制噪声，并且它会带来一个附加的问题，即从降低的成本的角度，它会增加部件数。

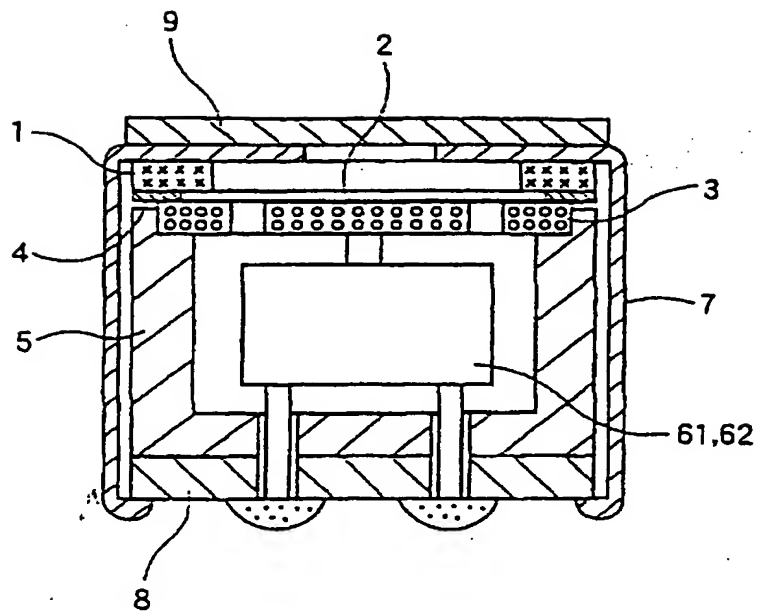


图 10

**THE PATENT OFFICE OF THE STATE INTELLECTUAL PROPERTY OFFICE  
OF THE PEOPLE'S REPUBLIC OF CHINA**



Address: No. 6 Xi Tucheng Lu, Jimeng Qiao Haidian District, Beijing Post code: 100088 P.O. BOX: Beijing 8020

**Shanghai Patent & Trademark Law Office**

Examiner

Application No.: 02119994.9	Department:	Date of Dispatch July 30, 2004
Applicant: CITIZEN ELECTRONICS CO., LTD.		
Title: CONDENSER MICROPHONE AND METHOD FOR MANUFACTURING CONDENSER MICROPHONES		

**THE OFFICE ACTION**

1. ☒ The Examiner has received the observations delivered by the applicant on May 8, 2004 in response to the First Office Action issued by the Patent Office, on the basis of which the Examiner has continued to proceed with the examination as to substance on the above application for patent for invention.  
☐ Based on the Decision on Reexamination made by the Reexamination Board of the Patent Office on \_\_\_\_\_, the Examiner has continued to proceed with the examination as to substance on the above application for patent for invention.
2. ☐ The amended documents submitted on \_\_\_\_\_ by the Applicant do not conform with Item 3, Rule 51 of the Implementing Regulations, and can not be accepted; the applicant shall submit the amended documents that are in accord with the requirement(s) within one month from the receipt of this Notice, or it will be deemed that the Notice has not been responded to, and the application will be deemed to have been withdrawn.
3. The continued examination is directed at the following application documents:  
☐ The amended application documents attached to the above observations.  
☒ The application documents as pointed out by the last Office Action and the replacement sheets of the amended application documents attached in the above observations.  
☐ The application documents as pointed out by the last Notice on Office Action.  
☐ The application documents as certified by the above Decision on Reexamination.
4. ☐ This Notice has not cited any new comparison documents.  
☒ This Notice has cited the following comparison material (The respective serial number(s) shall be used in the examination procedure(s) hereafter):

No.	Number/Title of Literature	Date of Publication (or the filing date of the conflicting Application)
1	CN1290998	April 11, 2001

5. The conclusive opinions drawn from the examination:

☐ **As regards the Specification:**

- ☐ The contents of the application fall under the scope stipulated by Article 5 of the Patent Law for which no patent right should be granted.
- ☐ The specification does not conform with the provision of Item 3, Article 26 of the Patent Law.
- ☐ The amendment of the specification does not conform with the provision of Article 33 of the Patent Law.
- ☐ The drafting of the specification does not conform with the provision of Rule 18 of the Implementing Regulations.
- ☐

☒ **As regards the Claims:**

- ☐ Claim \_\_\_\_\_ does not possess the novelty as stipulated in Item 2, Article 22 of the Patent Law.
- ☒ Claim 1-2 does not possess the inventiveness as stipulated in Item 3, Article 22 of the Patent Law.
- ☐ Claim \_\_\_\_\_ does not possess the practical applicability as stipulated in Item 4, Article 22 of the Patent Law.
- ☐ Claim \_\_\_\_\_ falls under the scope of Article 25 of the Patent Law where no patent right is to be granted.
- ☐ Claim \_\_\_\_\_ does not conform with the provision of Item 4, Article 26 of the Patent Law.
- ☐ Claim \_\_\_\_\_ does not conform with the provision of Item 1, Article 31 of the Patent Law.
- ☐ The amendment of the Claim \_\_\_\_\_ does not conform with the provision of Article 33 of the Patent Law.
- ☐ Claim \_\_\_\_\_ does not conform with the definition on invention as stipulated in Item 1, Article 2 of the Implementing Regulations.
- ☐ Claim \_\_\_\_\_ does not conform with the provision of Item 1, Rule 13 of the Implementing Regulations.
- ☒ Claim 3 does not conform with the provisions of Rules 20 to 23 of the Implementing Regulations.

Refer to the text of this Notice for the specific analyses of the conclusive opinion.

6. Based on the above conclusive opinion, the Examiner deems that:

- ☐ The applicant shall amend the application documents in accordance with the requirements raised in the text of the Notice.
- ☒ The applicant shall discuss in his observations reasons why this application for patent can be granted a patent right, and amend the portions indicated in the text of the Notice which have been deemed as not conforming with the provisions, Otherwise said application will be rejected.
- ☐ There is no substantive contents in the application for patent which can be granted a patent right. If the applicant does not have sufficient reasons to enable it to be granted a patent right, said application will be rejected.

7. The applicant is asked to note the following items:

- (1) According to the provision of Article 37 of the Patent Law, the applicant shall submit his observations within two months from the receipt of this Notice. Where, without justified reasons, the applicant does not respond at the expiration of said date, the application shall be deemed to have

been withdrawn

- (2) The amendments of the application shall be made in conformity with the provisions of Article 33 of the Patent Law and Rule 51 of the Implementing Regulations
  - (3) The Observations and/or amended documents of the applicant's shall be mailed or delivered to the Department of Receipt of the Patent Office. These documents shall have no legal effects if they are not mailed or delivered to the Department of Receipt
  - (4) Without first making an appointment, the applicant and/or his agent can not go to the Patent Office to have an interview with the Examiner
8. The text of this Notice totals 2 page(s), including the following attachments:
- ☒ duplicate copy(ies) of cited comparison document(s), altogether 1 copy(ies) 3 pages.
  - ☐

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## The Text of the Second Office Action

The examination is continuously made, the office action is provided as follows.

### 1. Claim 1 does not have inventiveness over D1.

Claim 1 requests to claim a condenser microphone. Reference document 1 (CN1290998A) has disclosed a semiconductor electret condenser microphone widely used as digital portable telephones (corresponding to the condenser microphone of claim 1) and the following technical features (See lines 3 to 11 of page 1 of the specification and Figure 10): comprising a printed circuit board 8 (corresponding to the substrate of claim 1), a back electrode holder 5 for holding a back electrode 3 and fixed on the printed circuit board, a spacer 4 provided on the back electrode, a diaphragm 2 provided on the spacer, and a ring 1 having a sound exporting hole and adhered to the diaphragm.

It can be seen that the technical solution of claim 1 is different from that of D1 in that claim 1 further defines the back plate secured to the substrate with adhesive, the spacer adhesively secured between the back plate and the diaphragm electrode. However, although D1 does not definitely limit whether the adhesive is used between the back electrode holder 5 and the printed circuit board 8, between the spacer 4, the back electrode 3 and the ring 1, in order to obtain a securely strong connection between these members it is common technical means for the person skilled in the present field to use an adhesive to secure them, and there has been the adhesive between the ring 1 and the diaphragm 2 in D1, thereby it is very easy and can be conceived to apply adhesive between other members. Therefore, claim 1 does not have prominent substantive features nor represents notable progress over D1, not conforming to the provision of Item 3 of Article 22 of the Chinese Patent Law.

2. The additional technical features of claim 2 have been disclosed in D1 (See lines 3 to 12 of page 1 of the specification, Figure 10). In D1,

a recess in which wirings connecting the back electrode, the diaphragm and the printed circuit board is also provided on a side of the microphone. Therefore, claim 2 does not have inventiveness over D1, not conforming to the provision of Item 3 of Article 22 of the Chinese Patent Law.

It is to be noted that the inventive title and the other portions of the specification should be adaptively corrected when amending the claims.

3. Claim 3 records that "stacking said aggregations... to form an assembly of aggregations", however, the steps of claim 3 do not offer in which order to stack said aggregations, whether this order is to depend on the above preparing steps of this claim, or to selectively change the position relationship between the aggregations. Therefore, the technical solution of claim 3 is not clear, not conforming to the provision of Paragraph 1 of Rule 20 of the Implementing Regulations of the Chinese Patent Law.

In view of the above-mentioned reasons, this application can not be granted a patent according to the present text of the application documents. The applicant should amend the application documents and overcome the above-mentioned deficiencies in accordance with the opinions of the examination. All amendments should conform to the provision of Article 33 of the Chinese Patent Law, i.e., they can not go beyond the scope defined by the original specification and claims.